

Researched & Published by WTIS Ltd
Wireless Telecommunications Information & Services

DECT INDUSTRY REPORT

A comprehensive and timely review of the industry, with strategic analysis and assessment of new product and market development opportunities, this report contains unique information and insights provided through long-standing industry involvement and experience,

*for established players...
across the value chain...
new market entrants...
technology suppliers...
telecom operators...
industry users...
ODM/OEMs...
investors...
analysts...*

secondary research, and direct interaction with members of the global *DECTweb* online community, industry experts, manufacturers and the DECT Forum

2005 EDITION

ISBN 0-9546945-1-1

SCOPE & STAKEHOLDERS

A comprehensive survey of today's DECT industry, offering insight into its present and future evolution, this report will benefit many industry stakeholders, assisting in the development of future business, market and investment strategies. Looking beyond market statistics, it examines the key factors that will influence future development and encourages companies to use such insight not simply to forecast but to shape that future.

The Financial Community - Understand where DECT fits in an increasingly complex wireless landscape. What is the role of this low-cost, mature, capable and still evolving, technology ? Does DECT still have growth potential – is it underestimated ?

Major Telecom Manufacturers - Telephones are the most pervasive consumer electronic product the world has seen. Major new geographical markets are opening to DECT, and future ones remain. To maintain profit margins in maturing markets requires continuing product evolution, a challenge that the DECT standards are rising to, with multimedia messaging, the Open Data Access Profile, SIP interworking and other innovations.

Telecommunications Network Operators - In the developing world, DECT has seen limited success for fixed wireless access; are there still opportunities in India & Russia ? In developed markets, fixed mobile convergence is being re-examined by network operators in the form of GSM-Bluetooth and GSM-WiFi - where does DECT fit in this picture ? Are such developments a threat or opportunity and how should operators view the role of DECT in this picture ? What are the lessons to be learned from recent failure of dual-mode GSM-DECT services in the UK and Germany ? What factors have changed and what are the same ? What are the preconditions for success for FMC ?

New Market Entrants & Niche Suppliers - The continuing migration of residential telephony from wired to cordless has attracted new entrants, many from Asia. Such new entrants have not confined themselves to the residential cordless market, but are also addressing business systems and niche markets. What are the opportunities for new entrants to the DECT market ? The forecast market growth remains significant – what factors should influence the strategy for a new entrant ?

Suppliers of Competing Technologies - Companies that have developed capabilities in Bluetooth, Wireless LAN or ZigBee potentially have the ability to impact the DECT marketplace. To date, with some notable exceptions, most such companies have maintained focus on their original target applications. As competition toughens, these companies are needing to better understand why DECT is such a strong competitor and how the technologies may play out in different markets.

Distributors - The distribution chain for DECT products varies significantly geographically. Thus, whilst generalities are dangerous, it is true to say that there are still new opportunities for distributors, as DECT addresses new geographical markets and as new entrants seek to gain access to established markets.

OVERVIEW

- 1 **MATURITY, MARKETS, PRODUCTS & PLAYERS:
THE PLACE OF DECT IN THE WIRELESS LANDSCAPE**
- 2 **THE GLOBAL MARKETPLACE:
REGIONAL ACCEPTANCE, USAGE & DEVELOPMENT**
- 3 **THE DECT FORUM & ITS GLOBAL ROLE**
- 4 **CONSUMER: RESIDENTIAL CORDLESS TELEPHONY**
- 5 **EXTENDING THE CONSUMER MARKET**
- 6 **DISRUPTIVE TECHNOLOGIES – VOIP, WIFI & VOWLAN**
- 7 **FIXED & MOBILE CONVERGENCE:
IMPLICATIONS FOR RESIDENTIAL CORDLESS**
- 8 **CORDLESS VOICE & DATA IN THE ENTERPRISE**
- 9 **CORDLESS HEADSETS**
- 10 **FIXED WIRELESS ACCESS USING DECT**
- 11 **THE TECHNOLOGY BASE**
- 12 **THE TECHNICAL STANDARDS**
- 13 **PRODUCT CONFORMANCE & REGULATION**
- 14 **IPR – INTELLECTUAL PROPERTY RIGHTS**
- 15 **GLOSSARY**

ANNEXES

- A **COMPANY DIRECTORY**
- B **BLUETOOTH**
- C **WIRELESS LAN IEEE 802.11**
- D **THE FCC UNLICENSED BAND RULING: SEPTEMBER 2004**

Further content information, including Sub-section Headings and Exhibit Listings are detailed on the subsequent pages.
E&OE – minor changes to the report text, section headings, etc may be made after printing of this brochure

© 2004/2005 WTIS Ltd. Usage & licensing terms of the report are detailed at the end of this booklet.

1 MATURITY, MARKETS, PRODUCTS & PLAYERS:	
THE PLACE OF DECT IN THE WIRELESS LANDSCAPE	
Setting the Scene	1
The Technology Landscape	1
Merits of Technological Maturity	1
Residential Digital Cordless - a Growth Market	2
More than Cordless Telephones ?	3
The Impact of the New Wireless Technologies	3
DECT and Bluetooth	4
DECT and Wireless LAN	5
DECT and ZigBee	5
DECT and UWB	6
DECT and 3G	6
Products and Markets – Today	7
Residential Telephony	7
Enterprise – Voice & Data	7
Cordless Headsets	8
Fixed Wireless Access	8
Products and Markets – Tomorrow	9
Residential Telephony – Messaging	9
The Converged Phone - FMC	9
Residential Markets – VoIP, Home Networking & Control	9
Enterprise – Integrated Data & Control	10
Enterprise – the Impact of 3G	10
The Players	11
Semiconductor Suppliers	11
Technology Suppliers	11
ODM Suppliers	12
Residential Telephone Suppliers	12
Business PBX Cordless Suppliers	13
Cordless Headsets and Other Specialised Markets	13
Fixed Wireless Access	13
Summary	14
Sources	14
2 THE GLOBAL MARKETPLACE:	
REGIONAL ACCEPTANCE, USAGE & DEVELOPMENT	
A Global Marketplace	15
Early Global Perspectives	15
Cordless in the World Today	15
Global Market Leaders	16
Origins of DECT - ‘The European Cordless Wars’	17
Strategies for Securing Spectrum	18
DECT Market Penetration – Europe and Beyond	19
Factors Stimulating New Geographic Market Growth	20
Global DECT Usage outside Europe	21
DECT in Europe	22
DECT Technical Standards – Origins and Development	22
From ‘Digital European...’ to ‘Digital Enhanced...’	22
Spectrum in Europe	23

Applications and Usage	24
Market Overview and Development	24
Regulatory Contacts & Further Information	26
DECT in the Russian Federation & the CIS	27
Applications	27
Fixed Wireless Access	27
Cordless Telephony	28
Market Access	28
Local Manufacture	28
Spectrum and Standards	28
Product Certification Framework	29
Wireless Local Loop Licensing	29
Regulatory Bodies – Goskomtelecom	29
Regulatory Bodies – GKRCH, Glavgossvyaznador and Gossviznador	30
Regulatory Contacts & Further Information	30
DECT in the Middle East & Africa	31
Early Acceptance but a Limited Market	31
Middle East – Spectrum Allocations & Usage	31
Middle East – Israel	32
The African Market	32
Africa – Wireless Local Loop	32
Africa – Spectrum Allocations & Usage	33
Regulatory Contacts & Further Information	33
DECT in Asia Pacific	34
The Role of Asia	34
Usage – Residential & Business Cordless	35
Usage – Wireless Local Loop	35
‘Cordless Wars: Round 2’ – DECT vs PHS	35
Spectrum Allocations	35
The Real Winners ?	36
DECT in India	36
The Role of Wireless Telecoms in India	36
Wireless Local Loop Provision 2004	37
Indigenous Industry	37
Spectrum Allocations	38
Structural Changes – Unified Licensing	38
Structural Changes – M&A	38
Impact of the Changes on DECT	39
Spectrum Review 2004	39
Regulatory Contacts & Further Information	39
DECT in China	40
The Significance of China	40
The Growth of the Chinese Economy & Teledensity	40
The Chinese Telecom Market	41
Spectrum & Standards	41
China as a Market for DECT ?	42
Potential Winners?	42
State Radio Regulatory Commission (SRRC)	43
Regulatory Contacts & Further Information	43
DECT in Australia & New Zealand	43

Australia – Market Size	43
Australia – The Situation pre-1999	44
Australia – The Interim Regime for CTS	44
Australia – Class Licensing – July 2001	44
New Zealand – Market Size	45
New Zealand – Initial Restrictions on DECT	45
New Zealand – General Licence for DECT – March 1999	45
New Zealand – General Licence for Cordless – June 2003	46
Regulatory Contacts & Further Information – Australia	46
Regulatory Contacts & Further Information – New Zealand	46
DECT in North America	47
The Cordless Market	47
Standards – The American Way	47
Analogue vs Digital	48
Growth of Digital	48
Unlicensed PCS 1910-1930 MHz & PWT	49
Proprietary 2.4 GHz DECT Derivatives – WDCT, MARS et al	50
HomeRF	51
FCC Rule Change 2002 – Standard DECT at 2.4 GHz	52
FCC Rule Change 2004 – Standard DECT in the UPCS Band	52
A Major New Growth Market	53
The Federal Communications Commission, FCC	53
Regulatory Contacts & Further Information	53
DECT in Central & South America	54
Markets & Applications	54
Fixed Wireless Access	55
Residential Products	55
Spectrum for DECT	55
New Market Opportunities ?	56
CITEL	56
Regulatory Contacts & Further Information	57
Sources	57
Exhibit 2.1	Global Cordless - Market Shares
Exhibit 2.2	Spectrum Allocations for DECT by Region
Exhibit 2.3	Penetration Beyond Europe – Drivers of Change
Exhibit 2.4	Relative DECT Usage outside Europe by Application
Exhibit 2.5	Spectrum Allocations – Europe
Exhibit 2.6	Spectrum Allocations – Middle East
Exhibit 2.7	Early DECT Wireless Local Loop Manufacturers & Products
Exhibit 2.8	Spectrum Allocations – Africa
Exhibit 2.9	Spectrum Allocations – Asia
Exhibit 2.10	Wireless Telecoms Provision in India 2004 – Wired & Wireless
Exhibit 2.11	US Cordless Market – Technology Composition
Exhibit 2.12	Annual Sales of 2.4GHz ISM Band Digital Cordless
Exhibit 2.13	Population & Internet Usage – The Americas
Exhibit 2.14	Spectrum Allocations – The Americas
Exhibit 2.15	CITEL – Member States

3 THE DECT FORUM AND ITS GLOBAL ROLE	
The International Industry Association	61
Position	61
Origins & History	62
The DECT Manufacturers' Forum	62
The DOG – DECT Operators' Group	62
Inauguration of the DECT Forum	62
Objective	63
Mission & Activity	63
Constitution, Structures & Organisation	63
The Forum Board	63
Role of the Board	64
Board Officers	64
General Assembly	64
Permanent Secretariat	65
Contact Details	65
Membership	65
Membership Rights & Benefits	65
Membership Options	65
Current Membership	66
Membership Fees	67
Membership Geography	67
Membership Type	67
Forum Activities and Publications	68
Regional DECT Fora & Working Groups	68
Shared Marketing and Promotion	69
Market Statistics	69
Regulatory, Spectrum & Standardisation Liaison	70
Health White Paper	71
Technical Studies – Data Applications (ODAP)	72
Publications, including White Papers	73
Future Plans and Development	73
Sources	74
Exhibit 3.1	DECT Forum Mission & Activities
Exhibit 3.2	Membership Rights
Exhibit 3.3	Member Companies 2004
Exhibit 3.4	DECT Forum Publications
4 CONSUMER: RESIDENTIAL CORDLESS TELEPHONY	
Scope	75
The Role of Cordless within the Residential Market	75
Europe	76
...and Markets Beyond	76
Opportunities and Threats	77
Europe – The Cradle of DECT	77
The European Residential Telephony Market	77
The Impact of Cellphones on Residential Telephony	77
DECT – The Engine of Residential Telephony	78

Market Dynamics – Accelerating the Product Lifecycle	79
The Transition from Corded vs. Cordless – By Volume	80
The Transition from Corded vs. Cordless – By Value	80
The Extinction of Analogue Cordless	81
Market Drivers - Europe	82
Initial Drivers for the Adoption of Residential DECT	82
Pricing as a Driver of Market Penetration	83
Pricing Trends	83
Pricing by end 2004	84
How Low will DECT Prices Go ?	85
Ongoing Drivers – Adding Value to Residential Cordless	85
Adding Value – Handsfree / Speakerphone	86
Adding Value – the TAM	86
Adding Value – Direct Mode Functionality	86
Adding Value – The Multipack	86
Feature Crossover from Mobile Phones	87
Building on Success – The Next Step	87
Rationale – Why Feature Crossover ?	87
Feature Crossover – Basic ‘Look & Feel’	88
Feature Crossover – Voice Dialling	89
Feature Crossover – Sound & Vision	90
Feature Crossover – Messaging: From SMS to MMS	92
Market Status	93
Overall Market Leadership	93
Country Leadership	94
Market Situation – Germany	95
Market Situation – Italy	96
Market Situation – France	96
Market Situation – Spain	97
Market Situation – UK	97
Market Situation – Russia	98
Market Growth	99
Market Maturity ?	99
Growth in Europe	100
Growth in North America	101
Growth in Australia & New Zealand	104
Growth in Asia: China and India	105
Market Forecasts	105
Detailed Market Intelligence	105
Market Sources – GfK	106
Market Sources – MZA	107
Market Sources – infoSource	107
Market Forecasts – Europe and Beyond	107
Opportunities and Threats for the Residential Market	110
Sources	111
Exhibit 4.1	Fixed Line & DECT Telephony Market Indicators
Exhibit 4.2	Global Fixed vs Mobile Line Penetration
Exhibit 4.3	Cumulative Worldwide Residential DECT Shipments
Exhibit 4.4	Western European Residential Market:

	Annual Sales of Corded vs Cordless, by Volume	
Exhibit 4.5	European Residential Market: Annual Sales of Corded vs Cordless, by Value	
Exhibit 4.6	European Residential Market: Analogue Cordless as a % of Fixed Line Telephones, by Volume	
Exhibit 4.7	Historical Pricing Trends: Median Pricing by Year	
Exhibit 4.8	European Residential Market: Product Pricing Trends	
Exhibit 4.9	Camera-Enabled Mobile Phones, Europe, Actuals & Forecast	
Exhibit 4.10	DECT Telephones with Advanced Sound & Vision Capabilities: New Products in 2004	
Exhibit 4.11	Colour Displays Usage in Mobile Phones, Europe	
Exhibit 4.12	Market Leadership – Europe	
Exhibit 4.13	Market Leadership by Country	
Exhibit 4.14	Short-term Market Drivers by Geographical Region	
Exhibit 4.15	US Cordless Market Shares by Company	
Exhibit 4.16	US Cordless Market Size by Technology	
Exhibit 4.17	Australia - DECT Market Share	
Exhibit 4.18	DECT Market Growth Forecast - Europe	
Exhibit 4.19	DECT Market Growth Forecast – Outside Europe	
Exhibit 4.20	Analysis of Historic Accuracy of Market Forecasts	

5 EXTENDING THE CONSUMER MARKET

Rationale for Residential Growth	113
Growth in a Mature Market ?	113
New Applications, not simply New Products	113
Chapter Scope & Approach	113
Cordless Telephone Links in the Home	114
Extending the Telephone Connection – the Wireless TLE	114
The Cordless Telephone Socket – Basic Added Value	114
Application to the Digital TV Set Top Box	115
TV-based Applications	118
Cordless Dial-Up Modems	119
Simple Range Extension – Repeaters	120
Residential PC & Telephony Networking	121
Early Steps to Residential Networking	121
PCs and Internet Access in Europe and North America	122
Europe – Early Steps in Telephony-PC Networking	124
North America – Early Steps in Telephony-PC Networking	126
Residential Security, Healthcare & Automation	128
Home Security	128
Family & Personal Security	130
Healthcare in the Home	132
Home Automation	134
Wireless Utility Metering	135
Wireless Appliance Control	136
The Role of ZigBee – Threat or Opportunity ?	136
Industry Recommendations	138
The Networked Home	138
Addressing the Market – Service Provision & Risk Sharing	138
Addressing the Market – ‘Simple’ Products	139

Addressing the Market – Product Bundling	139
To Standardise or Not to Standardise ? The Role of ODAP	140
Product Upgrades	140
Product Development Costs	140
Approaches to Company Strategy	141
Sources	142
Exhibit 5.1	Extended Applications for DECT Cordless in the Home
Exhibit 5.2	Subscription TV Revenues through 2008 (Europe)
Exhibit 5.3	Penetration of Home PCs with Internet Access, By Country
Exhibit 5.4	Numbers of People with Home PCs & Internet Access, By Country
Exhibit 5.5	Extended Applications: Telephony-PC Networking in the Home
Exhibit 5.6	Extended Applications to Home Security
Exhibit 5.7	Extended Applications to Family and Personal Security
Exhibit 5.8	The Ageing Population in Major European Countries
Exhibit 5.9	Extended Applications to Home Healthcare
Exhibit 5.10	Extended Applications to Home Automation
6	DISRUPTIVE TECHNOLOGIES – VOIP, WiFi & VOWLAN
Scope & Structure	144
Scope	144
Structure	145
VoIP - The Impact of the Internet on Telephony	146
Voice over the Internet	146
Internet-based VoIP – First Commercial Steps	146
IP-based Telephony in the Private Environment	146
Enterprise Networks – First Commercial Steps	147
IP-based Telephony in the Public Carrier Network	148
Public Carrier Networks – First Commercial Steps	148
A Paradigm Shift	149
Regulation of Public VoIP Services in North America	150
Regulation of Public VoIP Services in Europe	151
An Inevitable Transition	153
Transition Timescales	153
WiFi - IEEE802.11 Wireless LAN	154
The Emergence of WiFi	154
Wireless LAN – Rapid Growth after a Long Gestation	154
The Key to Growth – Intel	155
WLAN Residential Deployment	155
WLAN Enterprise Deployment	156
WLAN Cordless Phones	157
WLAN Public Deployments	158
Public Hotspots – A Business Case ?	161
Public Hotspots - Parallels with Telepoint ?	162
The Key Lesson	163
‘Hot Zones’ & ‘Hot Cities’	164
WiFi & 3G: Competitors or Complementary ?	165
WLAN-Cellular Dual-Mode Mobile Phones	166
VoIP over WLAN: Threat or Opportunity	166
VoWLAN – A New Competitor to DECT ?	166

Wireless VoIP - Industry Associations	166
VoWLAN – Where is it on the Gartner Hype Cycle ?	169
Residential Telephony – a Consumer Market	170
Factors Influencing Consumer Choice	172
Channels to Market for the Residential VoWLAN Cordless Phone	175
Existing Cordless Phone Distribution Channels	175
PC Distribution Channels	176
Mobile Phone Distribution Channels	177
The Future of Residential Cordless – a Role for VoWLAN ?	178
Product Responses from DECT Suppliers	178
A Strong Starting Point	178
An Evolutionary Route for the DECT Residential Market	178
DECT in Broadband Gateway Devices	179
Siemens	180
DeTeWe	181
Inventel	181
RTX Telecom	182
Dosch & Amand	182
Philips Semiconductors	182
DECT & VoWLAN – Opportunity or Threat ?	183
An Atlantic Divide ?	183
Short Term Developments - Europe	184
Short Term Developments - North America	185
Longer Term Outcome	186
Sources	187

Exhibit 6.1	WLAN Market Size 2003: Residential & Enterprise Shares
Exhibit 6.2	Residential/SOHO WLAN Market Shares
Exhibit 6.3	Enterprise WLAN Market Shares
Exhibit 6.4	Commercial WLAN Cordless Phone Products
Exhibit 6.5	Estimates of Regional WiFi Hotspot Deployment and Leading Operators – Europe, US & Asia
Exhibit 6.6	Public Hotspot Deployment by Country – Europe, US & Asia
Exhibit 6.7	Hotspot Location Types – Europe, US & Asia
Exhibit 6.8	Comparison of Telepoint & WiFi Public Hotspots
Exhibit 6.9	The Wireless Voice Consortium: Membership
Exhibit 6.10	The WiFi Alliance: Membership
Exhibit 6.11	Factors influencing Consumer Choice for Residential Cordless Telephones: DECT and IEEE802.11 Technologies

7 FIXED & MOBILE CONVERGENCE:

IMPLICATIONS FOR RESIDENTIAL CORDLESS

Scope	191
Fixed-Mobile Convergence (FMC) – Inevitable ?	191
The Twin Concepts of Service & Product Convergence	192
Chapter Structure	193
Service Convergence - Messaging	193
Recent Industry Developments	193
The Growing Value of Messaging – SMS & MMS	194
Short Messaging Service - SMS	195

SMS Message Formats & Encoding	195
SMS Market Size & Growth	196
Fixed Network SMS – ETSI Standards	197
Fixed Network SMS – Transmission	198
SMS on Residential DECT Phones	199
Fixed Network SMS – Commercial Deployment	200
Evolution to Multimedia Messaging Service - MMS	201
MMS-enabled Applications	202
MMS Message Formats & Delivery	202
MMS on the Fixed Network	203
The F-MMS Forum	204
F-MMS Standards – ETSI and 3GPP	205
F-MMS Infrastructure Requirements	205
F-MMS Terminals – Completing the Picture	205
Commercial Deployment of F-MMS	206
The Residential DECT Market – Impact of F-MMS	207
Indicators for the DECT MMS Market	208
Guidelines for the DECT Industry	209
Product Convergence – The Dual Mode Phone	209
The Combined Mobile-Cordless Phone	209
Prospects for such Dual Mode Phones	211
Lessons from History: Conception of the DECT-GSM OnePhone	211
From Operator Trials to Commercial Service	213
UK: The BT OnePhone Service	214
Germany: The T-Com OnePhone	215
Recent Initiatives: KT’s ‘Mu’ Service	218
Recent Initiatives: BT’s Project BluePhone	219
Recent Initiatives: Unlicensed Mobile Access, UMA	220
Recent Initiatives: Fixed-Mobile Convergence Alliance	222
Bluetooth Phones – Status	223
WiFi Phones – Status	225
The Future of Product Convergence – Analysis	228
Convergence – Present Status	228
Consumer Perspectives	229
Operator Perspectives	230
Manufacturer Perspectives	231
Outlook for the New ‘OnePhone’	232
Impact of Convergence on the DECT Residential Market	234
Impact of Convergence - DECT & Fixed Messaging	234
Dual Mode Cordless-Cellular Phones	234
Industry Recommendations – Indicators to Monitor	235
Sources	236
Exhibit 7.1	Forecast Development of the European SMS & MMS Market
Exhibit 7.2	ETSI Fixed Network SMS Standards
Exhibit 7.3	DECT Phones Supporting SMS
Exhibit 7.4	F-MMS Forum Membership 2004
Exhibit 7.5	Forecast Growth of the European F-MMS Terminals Market (Belgium, France, Germany, Netherlands, Italy, Spain, UK)
Exhibit 7.6	Indicators for the Growth of the MMS-enabled DECT Residential

	Market	
Exhibit 7.7	Recent Converged Phone Initiatives	
Exhibit 7.8	Manufacturers involved in Dual Mode DECT-GSM Phones	
Exhibit 7.9	Factors influencing the DECT-GSM Dual Mode Consumer Offering	
Exhibit 7.10	The Project BluePhone Consortium: Membership & Roles	
Exhibit 7.11	Companies involved in Unlicensed Mobile Access	
Exhibit 7.12	UMA Technical Standards	
Exhibit 7.13	Bluetooth Cordless Telephone Products	
Exhibit 7.14	Bluetooth Cordless Telephony Access Point Products	
Exhibit 7.15	Company Announcements of Advanced WiFi ICs for Handsets	
Exhibit 7.16	Company Announcements of WiFi-Cellular Handsets	
Exhibit 7.17	Factors and Indicators to Watch influencing the Evolution of the DECT Residential Market	

8 CORDLESS VOICE & DATA IN THE ENTERPRISE

Digital Cordless in the Enterprise – DECT’s Original Target	239
Enterprise Applications - The Rationale for DECT	239
The Enterprise CPE Market	240
Segmenting the Enterprise Market & Quantifying Benefits	240
Development of the Enterprise Market	240
Competing Technologies in the Enterprise Market	241
Guidelines for Enterprise Suppliers and Consumers	241
The Enterprise CPE Market	241
Telephony Origins of the Enterprise CPE Market	241
The Advent and Growth of Enterprise Computing	242
The Strategic Role of IT	242
The New Realities	242
Enterprise Cordless Markets in Europe & North America	243
Segmentation and Benefits for the Enterprise Market	245
Market Segmentation	245
DECT Adoption by Market Segment	246
Perceived Drivers for Cordless Mobility	250
Assessing the Nature of the Business Benefit	251
Quantifying the Benefits	251
Business Systems for Different Customer Types	252
Market Customisation	253
DECT Enterprise Market Statistics	254
Development of the Enterprise Market	255
Two Major Trends	255
IP-PBXs in the Enterprise	255
IP-PBXs – Market Transition	256
IP-PBXs – Market Growth Forecasts	257
The Role of DECT in Encouraging Hybrid IP-PBX Solutions	259
Telephony & Data Integration	259
Example DECT PABX Product Offerings	261
Industrial Control Applications	263
The Potential for Full WWAN Integration – the Role of 3G	265
Competing Wireless Solutions – Enterprise VoWLAN	266
Alternative Options	266
PBX Suppliers – DECT & WLAN ?	267

Wireless LAN Phone Infrastructure – Concept	267
Wireless LAN VoIP Phones – Present Status	268
Pros & Cons of WiFi Telephony as an Enterprise Solution	270
Key Issues – Reliability & Service Quality	271
Key Issues – Security	271
Key Issues – Roaming & Handover	272
Key Issues – Capacity & Coverage	272
Key Issues – Power Consumption	273
Assessment – WLAN Telephony in the Enterprise	273
Alternative Proposals for On-site Wireless Mobility	274
Bluetooth Telephony Enterprise Solutions	274
Assessment – Bluetooth in the Enterprise	275
Cellular Centrex Solutions	276
Assessment – Cellular Centrex	276
Low Power GSM Solutions	277
Assessment – Low Power GSM	278
Guidelines for Suppliers & Enterprises	278
Market Development & Geography	278
Opportunities for Established PBX Suppliers	280
Opportunities for New Entrants	281
The Enterprise Perspective	282
Technical Factors in Evaluating Solution Suitability	284
Concluding Remarks	285
Sources	286
Exhibit 8.1 Enterprise CPE Market Shares Q3 2003 - Europe	
Exhibit 8.2 Example DECT Intrinsically Safe Telephones	
Exhibit 8.3 Enterprise DECT Market – Growth & Market Forecast	
Exhibit 8.4 IP Penetration of the PBX Market – Europe & Worldwide	
Exhibit 8.5 IP PBX Worldwide Market Growth Forecast	
Exhibit 8.6 IP PBX Worldwide Market Shares 2003	
Exhibit 8.7 Example DECT PBX Messaging Product Offerings	
Exhibit 8.8 Relative Importance of Factors influencing Acceptance of WiFi Telephony for the Residential and Enterprise Markets	
Exhibit 8.9 A US IT Industry Perspective on the Role of Wireless Networking Technologies	
Exhibit 8.10 Pros & Cons of Cellular Centrex	
Exhibit 8.11 Comparison of Alternative Cordless Telephony Technologies	
9 CORDLESS HEADSETS	
The Cordless Headset Market	288
A Niche but Significant Market with Distinct Segments	288
Manufacturer Market Shares	290
Specialist Suppliers	290
Technology Choices	291
DECT as an Established Technology	291
The Impact of Bluetooth	291
New Entrants - Supplier Proliferation	291
The Installed DECT Telephony Base	293
New Product Opportunities for DECT Market Growth	294

The Cordless Headset Supplier Perspective	294
New DECT Product Concepts	295
Sources	297
Exhibit 9.1	Cordless Headsets Potential Addressable Market
Exhibit 9.2	Cordless Headsets Manufacturers: Market Shares by Manufacturer Turnover
Exhibit 9.3	Bluetooth Cordless Headset Suppliers
10	FIXED WIRELESS ACCESS USING DECT
The Impact of Telecommunications in the Developing World	298
Telecommunications as a Development Tool	298
The Economic Argument for Wireless Technology	298
DECT Offerings for FWA	299
Contract Awards for Commercial Systems	299
Early Deployment Difficulties	300
External Economic Factors	301
Telcos – The Impact of PTT Privatisation in Developing Countries	301
Manufacturers – The Need to Focus Investment	301
DECT vs Cellular for FWA Coverage	302
Current Status of DECT FWA	303
The Current Status of DECT WLL Deployments	303
India	304
Russia and the CIS	306
DECT FWA Suppliers Today	306
Local Suppliers & Products	306
The Future of DECT in the Local Loop	308
The WLL Market in Developing Countries	308
An Alternative Business Model	311
Russia & the CIS	312
Questions for DECT WLL	313
Product Positioning & Evolution	313
Multinational Competition and Market Specialisation	314
Sources	315
Exhibit 10.1	Early Commercial DECT FWA Contracts
Exhibit 10.2	Issues Encountered with FWA Deployments
Exhibit 10.3	Economic Factors Affecting FWA Deployments
Exhibit 10.4	Comparison of DECT and Cellular Approaches for WLL
Exhibit 10.5	Evolution of DECT FWA Deployment in India
Exhibit 10.6	Evolution of DECT FWA Deployment in the Russian Federation & CIS
Exhibit 10.7	DECT WLL Suppliers & Products in India
Exhibit 10.8	DECT WLL Suppliers & Products (Outside India)
Exhibit 10.9	Teledensity in India: Progress 1996-2004
Exhibit 10.10	Key Factors influencing DECT's WLL Future
11	THE TECHNOLOGY BASE
Status & Scope	317
Technology & Supplier Status	317

Technology for New Market Entrants	317
Chapter Scope	318
The Basic Technology Concepts	318
Fundamental Architecture	318
Radio Reception & Transmission	319
Speech & Baseband Processing	319
Control & Display	319
Implementation	320
Technology Relationships – DECT, Bluetooth and WiFi	320
Semiconductors	321
Major Suppliers	321
Infineon	323
Philips	323
National Semiconductor	323
Winbond	324
Atmel	324
DSPG	324
Power Amplifiers	325
Product Design Services	325
Design Services Companies – The Pioneer in DECT	325
Inventel	327
RTX Telecom	327
Arkon Networks	327
Cambridge Consultants Ltd	328
Plextek	328
Federal Technologies	329
Thales Electronic System Solutions, TESS	329
Winfinity	329
Other Suppliers	329
Original Design Manufacturers, ODMs	330
The Emergence of ODMs	330
Suncorp Technologies	330
Giant Wireless	331
Eidicom	331
Goldtop 2000	331
Ascalade	332
Aztech	332
‘Branded ODMs’	332
Modules	332
Types of Module Suppliers	332
ALPS	334
Digades	335
Hoeft &Wessel	335
Kirk Telecom	335
Samsung	336
Siemens	336
Software	336
Types of Software	336
Protocol Stack Software	337
Silicon & Software Systems Ltd. (S3)	338

Bithium	338
ComSquare AG	339
MPC Data	339
Raycomm	339
Fraunhofer IIS	339
Control, Man Machine Interface & Applications	340
Applications – Text Entry Software	341
Encouraging New Applications	342
BoM Manufacturing Costs	343
Historical Bill of Materials (BoM) Costs	343
Basic Handset BoM Trends	344
Bill of Materials Definition	344
BoM Estimates for Base Station	345
BoM Estimates for Additional Features	345
Future BoM Trends - Drivers & Limits	345
Increasing Silicon Integration	346
Comparing BoM Costs – DECT and Bluetooth	347
Manufacturing Volume	347
Supplier Competition	348
Product Price Trends in Mature Markets - Europe	349
Product Price Trends – North America	349
Product Price Trends – China	349
Technology Status - Summary	350
Sources	350
Exhibit 11.1	DECT RF & Baseband Semiconductor Solution Suppliers & Products
Exhibit 11.2	DECT Power Amplifier Suppliers & Products
Exhibit 11.3	DECT Technology Suppliers - Design Services
Exhibit 11.4	DECT Module Suppliers & Products
Exhibit 11.5	DECT Technology Suppliers – Protocol Software
Exhibit 11.6	Text Entry Software - Licensees
Exhibit 11.7	BoM Trends vs Time – Basic DECT Handset
Exhibit 11.8	BoM Costs for Basic & Additional Functionality
Exhibit 11.9	Bluetooth IC Cost Trends
12 THE TECHNICAL STANDARDS	
The Importance and Role of Technical Standards	352
Technical Standards in a Global Industry	352
Markets and Standards	352
ETSI and Standards	353
Open vs. Proprietary Standards	354
The Role of ETSI in DECT Standards Development	354
DECT as a Flagship Standard of the Newly Formed ETSI	354
Mechanisms - The ETSI DECT RES-03 Committee	355
Mechanisms - ETSI Project DECT (EP)	355
Internationalisation of the ETSI Standards	356
Chapter Overview	356
Definitions & Concepts	357
Basic Terminology & Definitions	357
Hardware – Fixed Parts and Portable Parts	357

Hardware – Other Elements of the DECT System	358
DECT Authentication Module, DAM	358
Wireless Relay Stations, WRS	358
Technical Basics	359
The DECT Air Interface – MC/TDMA/TDD	359
Packet Structures	360
High Data Rate Support	360
Dynamic Channel Selection	361
The ETSI DECT Standards Documents	361
ETSI Publication Types Relating to DECT	361
A Guide to the DECT Standards	362
The DECT Common Interface Baseline Standard	364
Origins, History & Objective	364
Structure of the Common Interface Standard	364
Part 1: Baseline Standard Overview	365
Part 2: Physical Layer (PHL)	365
Part 3: Medium Access Control (MAC)	366
Part 4: Data Link Control (DLC)	366
Part 5: Network Layer (NWK)	366
Part 6: Identities and Addresses	367
Part 7: Security	367
Part 8: Telephony	367
Profiles	368
The Concept & Implementation of Profiles	368
The Generic Access Profile (GAP)	369
Data Services Support and the Origins of DPRS	369
The DECT Packet Radio Service (DPRS) Profile	371
Application Specific Access Profiles (ASAPs)	372
ASAPs - The DECT Multimedia Access Profile (DMAP)	372
ASAPs – Ethernet Interworking	373
ASAPs – V.24 Interworking	373
Cordless Terminal Mobility Access Profile, CAP	373
Radio Local Loop Access Profile, RAP	374
ISDN Interworking Profiles	375
DECT-GSM Interworking	376
DECT & 3G Standards	377
3G Standardisation	377
DECT & IMT-2000	378
The DECT/UMTS Interworking Profile	379
Structure & Content of TS 101 863	381
DECT & IP Access	382
DECT-IP Interworking Scenarios & Applications	382
The TS 102 265 Specification	383
Implementation Requirements	384
The Open Data Access Profile	385
Origins of ODAP	385
Goals of ODAP	385
Functionality Requirements	386
The ODAP Specification & Architecture	386
Ongoing Standard Developments by EP DECT	387

Standards for North America & RoW	388
Scope and Approach	388
PWT: An Unlicensed PCS Technology	388
ISM: WDCT – ‘Worldwide Digital Cordless Telecommunications’	390
ISM: MARS	391
DECT-ISM: TS 101 948	392
DECT-ISM: 2002 FCC Part 15 Rule Changes	392
2004 FCC Rule Changes – Standard DECT Products in the USA	393
Technical Variants for RoW	394
Sources	395
Acknowledgements	396
Exhibit 12.1	High Data Rate Services: Modulation Formats
Exhibit 12.2	Structure and Interdependence of the DECT Standards
Exhibit 12.3	Structure and Scope of the Base Common Interface Standard
Exhibit 12.4	Service Types & Mobility Classes for DECT Data Applications
Exhibit 12.5	Scope of the DECT Data Profiles (D/E)
Exhibit 12.6	Scope of the DPRS Profile
Exhibit 12.7	Scope of the DECT RAP (Radio Local Loop Access Profile)
Exhibit 12.8	ETSI Technical Reports relevant to DECT FWA
Exhibit 12.9	Scope of DECT ISDN Interworking
Exhibit 12.10	The IMT-2000 Family of 3G Air Interface Standards
Exhibit 12.11	USIM Roaming between DECT & UMTS
Exhibit 12.12	Reference Configuration for IP-Interworking in the DECT Fixed Part
Exhibit 12.13	Example for SIP-Interworking for an Outgoing Call
Exhibit 12.14	Open Data Access Profile Functionality Goals
Exhibit 12.15	The Basic ODAP System Architecture Reference Model
Exhibit 12.16	PWT Physical Layer Specifications
Exhibit 12.17	WDCT Physical Layer Specifications
Exhibit 12.18	DECT Carrier Numbers & Positions
13	PRODUCT CONFORMANCE & REGULATION
The Need for Conformance and Regulation	397
The European Regime	398
A Changing Scene	398
The Radio equipment and Telecommunications Terminal Equipment (R&TTE)	
Directive	399
Approaches to Conformance	400
Essential Requirements of the R&TTE Directive	400
Manufacturer Responsibility	402
Manufacturer Options for Conformity Assessment	402
Internal Production Control	403
Technical Construction File	403
Full Quality Assurance	403
DECT Conformance Requirements	404
Common Requirements	404
Protocol Conformance	405
Profile Test Specification Requirements	405
Additional Conformance Requirements	407
Sources	407

Exhibit 13.1	Manufacturer Choices for Conformity Assessment for Harmonised Standards under the R&TTE Directive	
Exhibit 13.2	Conformance Specification for DECT Profiles	
Exhibit 13.3	Additional Conformance Specifications	

14 IPR - INTELLECTUAL PROPERTY RIGHTS

Scope		409
Protection of Intellectual Property		409
Approach & Structure		409
The Patent Process		409
Patent Protection – Essential Requirements		409
Initial Filing		410
Regional Filing		410
Patent Cooperation Treaty		410
National Filings		411
IPR Usage in the Telecommunications Industry		411
Technical Standards & IPR		411
Exploitation of Patents		412
Patent Trading		412
Patent Pooling		413
Patent Licensing		413
Submarine Patents		414
ETSI Standards: Vulnerability to Submarine Patents		415
‘Essential’ & ‘Non-Essential’ IPR		415
ETSI’s IPR Policy		416
The Need for an IPR Policy		416
The Nature of ETSI’s Policy		416
ETSI’s Rules on ‘Essential IPR’		416
The ETSI IPR Database		417
Growth and Composition of ETSI’s IPR Database		417
ETSI IPR Policy & Further Information		419
IPR in DECT Standards		419
DECT Essential IPR and the ETSI IPR Database		419
Ownership of DECT Essential IPRs in ETSI’s Database		420
Ownership of the DECT Essential IPRs for Baseline Products		421
IPR, Competition and the Role of the European Commission		422
Competition Law and DECT Essential IPR		423
New Market Entrants & Essential IPR’s		424
A DECT Patent Pool ?		424
Sources of IPR Information: Patent Databases		425
European Patent Office (EPO)		425
The US Patent & Trademark Office (USPTO)		426
World Intellectual Property Organization (WIPO)		426
Africa Regional International Property Organisation (ARIPO)		427
Thomson – Delphion Research		427
Indian National Informatics Centre (NIC)		428
Sources		428

Exhibit 14.1	‘Essential IPR’ Declarations to ETSI	
--------------	--------------------------------------	--

- Exhibit 14.2 Comparison of ‘Essential IPR’ Declarations to ETSI relating to DECT, GSM, GPRS & UMTS
- Exhibit 14.3 DECT ‘Essential IPR’ Declarations to ETSI Breakdown by Companies & DECT Standards

15 GLOSSARY 430-437

ANNEXES

A COMPANY DIRECTORY 438-566

Details of all the major players and most of the smaller players in the DECT supply chain – manufacturers / suppliers of residential and business systems, fixed wireless systems, DECT technology suppliers and ODM/OEMs, test equipment suppliers, conformance test houses, etc

B BLUETOOTH

Purpose & Scope	567
Origins & Relationship to DECT	567
Ericsson’s ‘MC Link’	567
Building on DECT	567
The Bluetooth SIG	568
Bluetooth Market Growth	568
Evolution of Bluetooth Specifications	569
The Specification Process	569
Bluetooth v1.0	569
Bluetooth v1.1	569
Bluetooth v1.2	570
Bluetooth v2.0+EDR	570
Future Evolution	571
Specification Update Procedure	571
Bluetooth Technical Specifications	571
Physical Layer Specifications & Performance	571
Link Management	573
The Host Controller Interface	573
L2CAP – Logical Link Control and Adaptation Protocol	573
RFCOMM	574
Service Discovery Protocol	574
Bluetooth Profiles	574
The Role of Profiles	574
Basic Profiles	575
The Generic Access Profile, GAP	575
Service Discovery Application Profile, SDP	575
Serial Port Profile	576
Generic Object Exchange Profile, OBEX	576
Dial-Up Networking Profile, DUN	576
Fax Profile, FAX	576
LAN Access Profile, LAN	576
File Transfer Profile, FTP	576
Object Push Profile	577
Synchronisation Profile	577
The Cordless Telephony, Intercom & Headset Profiles	577

Profile Interdependency	578
Additional Profiles	578
Sources	
Exhibit B.1	Bluetooth RF Parameters
Exhibit B.2	The Basic Bluetooth Profiles
Exhibit B.3	Functionality of the Various Bluetooth Speech Profiles
Exhibit B.4	Structure and Interrelationship of the Bluetooth Profiles
Exhibit B.5	Additional Bluetooth Profiles
C	WIRELESS LAN STANDARDS IEEE802.11
Purpose & Scope	582
The IEEE 802.11 Standards Family	582
IEEE 802 Networking Standards	582
Wireless Networking Standards – IEEE 802.11	583
Wireless LAN Market Growth	583
IEEE 802.11 Technical Standards	584
The Basic IEEE 802.11 Standard	584
IEEE 802.11a - v	586-590
Sources	591
Exhibit A.1	Global Shipments of IEEE 802.11 Wireless LAN ICs, 2001-2007
Exhibit A.2	Summary of the IEEE 802.11 Task Group Activities
Exhibit A.3	Physical Layer Technical Characteristics, IEEE 802.11a, b, g
D	THE FCC UNLICENSED PCS BAND RULING: SEPTEMBER 2004
Purpose & Content	592
Unlicensed PCS & Advanced Wireless Services, AWS	592
The Origins of Unlicensed PCS	592
Spectrum Etiquette	593
The AWS Consultation	593
DECT Forum Proposals	594
Objections & Support	595
The Outcome	595
The FCC Rulings	596
The FCC Decisions relevant to DECT	596
Extract from FCC 04-219:	596
‘Additional Flexibility in the 1920-1930 MHz Band’	596
Implications: Bringing DECT Products to Market	598
Standard DECT in the USA – Timescales	598
Types of DECT Products Permitted	598
Approval Mechanisms for DECT Products	599
Equipment Authorisation – Electronic Filing	599
Equipment Authorisation – Filing with a Certification Body	599
Equipment Authorisation – Specific Filing Requirements	599
Non-Telephony DECT Products	600
Ongoing NPRM	600
Sources	601
Caveat	602

The DECT Industry Report

(ISBN 0-9546945-1-1)

Purchasers of this report are free to use it within their organisations subject to the scope of the license requested (single/multi/corporate user):

Licensee:
(Name/Company)

Access Code:
(Use to open CD
files when prompted)

License Type: *Single User / Multiple User / Corporate User*

Electronic Copy - Single User License - Usage is limited to a single individual using the original CD-ROM medium – an electronic copy of the report may be made for back-up purposes and a copy may be made onto a single office personal computer and a single laptop computer provided these are intended for use by a single individual and that the content is not made available via the company network. Access should not be made available to contractors, suppliers, customers or other third parties. Multiple hard copies (paper copies) may be made and used within the organisation up to a limit of 5 copies; it is a condition of the licence that the individual/department responsible for purchase shall keep a record of such copies, that each be numbered and their location recorded, and that this record be made available to the licensor on request. A unique electronic access code, individual to the person responsible for purchase, is made available to allow regulation and tracking of usage in conformance with these terms.

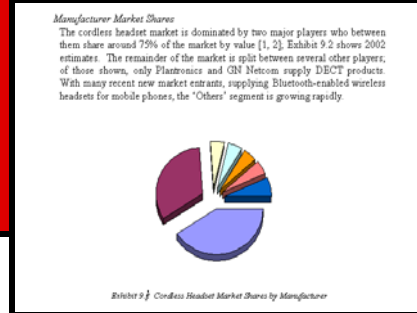
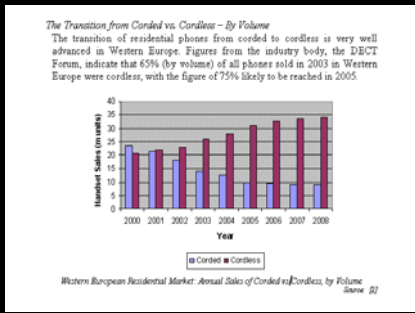
Electronic Copy - Multi-User License – Up to 5 electronic copies of the report may be made for use by individuals directly employed by the purchasing organisation – an electronic copy may also be made by the individual responsible for purchase for back-up purposes. Access should not be made available to contractors, suppliers, customers or other third parties. Multiple hard copies (paper copies) may be made and used within the organisation up to a limit of 5 copies; it is a condition of the licence that the individual responsible for purchase shall keep a record of such copies, that each be numbered and their location recorded, and that this record be made available to the licensor on request. A unique electronic access code, individual to the person responsible for purchase, is made available to allow regulation and tracking of usage in conformance with these terms.

Electronic Copy - Corporate License - Multiple electronic copies of the report may be made for use by individuals directly employed by the purchasing organisation. Access should not be made available to contractors, suppliers, customers or other third parties. A copy of the report may also be stored on the company Intranet and used for unrestricted company-wide access. Multiple hard copies (paper copies) may be made and used within the organisation; restrictions do not apply. A unique electronic access code, individual to the purchasing company, is made

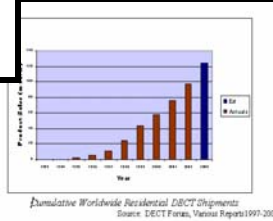
© 2004, 2005 WTIS Ltd. All Rights Reserved. Unauthorised Reproduction Prohibited
Published by WTIS Ltd, Wireless Telecommunications Information & Services

Registered in England No. 4303918 Registered Office 51 St Blaize Road, Romsey, SO51 7JY, UK

Insight



Information



Perspectives

Accelerated Product Lifecycle
DECT product designs have enjoyed a relatively short product lifecycle. This has arisen from the rapid technology advances, offering frequent opportunity for manufacturing cost reductions. Bill of materials (BoM) have consequently fallen dramatically over the past 5c, as increasing integration and increased competition have driven cost reductions. These cost falls are more fully detailed in the Chapter 'The Technology Base'.

Factors Stimulating New Geographic Market Growth
At the time of preparation of this report, all three of these factors are experiencing significant shifts, as summarised in the Exhibit below. These changes are set to increase penetration in geographical markets outside Europe.

Barriers to Wider Acceptance & Usage	Present Changes
Trade Barriers	Liberation of telecommunications regulation around the world is opening up new geographical markets as regulators increasingly adopt a technology-neutral approach.
Product Pricing	Falling technology costs and decreasing economies of scale for DECT are resulting in continuing and substantial reductions in component and product prices.
Manufacturing Focus	Marketing specialists in Europe are convincing manufacturers to look to seek to address new country markets, which are becoming more immediate opportunities in the light of the above two factors.

Penetration Beyond Europe - Drivers of Change

Early Deployment Difficulties
Early DECT WLL deployments in developing countries suffered from various generic difficulties, mostly not specifically related to the technology nor the suppliers, but which nonetheless hampered market growth. Typical issues were:

Factors	Impact
Inadequate Local Information	Network planning difficulties due to inaccurate population statistics
System Customisation	Planning delays due to excessive customisation - rural topography and distribution of subscribers vary significantly in terms of total population, population density and required number of lines
Interfacing with Existing Infrastructure	Requirements to implement expensive upgrades to exchange switches or to purchase new switches as part of the procurement
Wayleave Approval	Delays in securing wayleave approvals for towers and feed installations
Spectrum Approval	Delays securing full frequency clearance
Local Sourcing of System Elements	Decisions to use locally-sourced equipment - towers, site panels, shelters to house the equipment, air conditioners - which subsequently proved difficult to source
Residential Installation	Insufficient power outlets in customer's home

Sources: [1, 2]

Analysis

This comprehensive report explores, inter alia:

- DECT Usage around the Globe - Use & Applications, Spectrum Allocations, Regulatory, New Geographical Markets
- The DECT Forum - Objectives, Structure, Role & Activities
- Market Structures & Key Players - Strategy & Market Share
- Residential, Enterprise & Vertical Markets, Cordless Headsets, Fixed Wireless Access
- Market Growth Opportunities - including Fixed Messaging, Extended Residential Applications
- Disruptive Technologies - Analysis of the Impact of VoIP, WiFi, VoWLAN, FMC (service & product convergence)
- The Technology Base - Semiconductors, Design Services, Modules, Software, ODMs, Evolution of BoM & Pricing
- Standardisation - The ETSI Standards, Profiles, Regional Variants, Essential IPR, DECT-IP, DECT-UMTS, ODAP
- Annexes: Comprehensive Company Directory, Bluetooth, IEEE 802.11 technologies & the Sept '04 FCC DECT decision

ISBN 0-9546945-1-1
Published by WTIS Ltd, Wireless Telecommunications Information & Services
© 2004, 2005 WTIS Ltd
All Rights Reserved, Unauthorised Reproduction Prohibited
Single User, Multi User & Corporate Wide Licensing Options

For PC or MAC
Electronically Searchable using Adobe Acrobat®